MOROZ, V.I.

Infrared spectroscopy and life on Mars. Priroda 53 no.3:111-112
'64.   (MIRA 17:4)

1. Gosudarstvennyy astronomicheskiy institut im. P.K.Shternberga,
Moskva.

L 11530-66   EWT(1)   GW

ACC NR: AR6001132   SOURCE CODE: UR/0269/65/000/009/0055/0055

SOURCE: Ref. zh. Astronomiya, Abs. 9.51.465

AUTHOR: Moroz, V. I.

TITLE: The phase effect of strong CO_2 absorption bands in the spectrum of Venus

REFERENCED SOURCE: Astron. tsirkulyar, no. 305, okt. 12, 1964, 1-2

TOPIC TAGS: absorption band, Venus planet, spectrum, absorption coefficient

TRANSLATION: A threefold decrease in the equivalent widths of the strong CO_2 bands λ 1.575, 1.606, and 2.05 μ, and the disappearance of the mean bands λ 1.56 and 2.15 μ are observed when the phase angle ϕ = 150°. The dependence of the equivalent line widths W upon $\varepsilon^{3/2}$, where ε = cos ϕ, is almost linear. This effect can be explained under the assumption that the cloud layer of Venus has a sharp cutoff, below which the volume scattering coefficient σ = $5 \cdot 10^{-7}$ = const, while the absorption coefficient k decreases with altitude according to the barometric height formula. Only first-order scattering with a spherical indicatrix is taken into account. V. B.

SUB CODE: 03

Card 1/1   UDC: 523.42

L 00068-66   EWT(m)/EPA(w)-2/EWA(m)-2   IJP(c)

ACCESSION NR: AP5021327

UR/0120/65/000/004/0039/0042
539.1.073.3

AUTHOR: Kazanskiy, G. S.; Mikhaylov, A. I.; Moroz, V. I.

TITLE: Synchronization of the operation of two bubble chambers during a single accelerating cycle of the 10 BEV proton synchrotron

SOURCE: Pribory i tekhnika eksperimenta, no. 4, 1965, 39-42

TOPIC TAGS: bubble chamber, synchrotron, proton accelerator, particle accelerator target, BEV accelerator

ABSTRACT: This article describes a method for the joint operation of two bubble chambers during a single accelerating cycle of the synchrotron of the OIYaI. This type of simultaneous operation was first achieved in 1962 and is presently in widespread use. The problems connected with the stabilization of the given intensity levels of the proton beam incident on the targets are briefly discussed. The article contains also the pertinent data concerning the operating conditions of the two jointly acting chambers. The method outlined can be extended to an even larger number of bubble chambers. The authors thank Yu. A. Troyan and A. P. Tsarenkov for participating in the establishment of the joint operation of the two

Card   1/2

L 00068-66

ACCESSION NR: AP5021327

chambers." Orig. art. has: 2 formulas and 2 figures.

ASSOCIATION: Ob"yedinennyy institut yadernykh issledovaniy, Dubna
(Joint Institute for Nuclear Research)

SUBMITTED: 27May64   ENCL: 00

NO REF SOV: 005   OTHER: 000   SUB CODE: NP

Card   2/2

VISHNEVSKIY, V.F.; DU YUAN'-TSAY [Tu Yüan-ts'ai]; MOROZ, V.I.; NIKITIN, A.V.;
TROYAN, Yu.A.; TSZYAN SHAO-TSZYUN' [Chiang Shao-chun];
CHZHAN VEN'-YUY [Chang Wên-yu]; SHAKHBAZYAN, B.A.;
YAN' U-GUAN [Yen U-kuang]

Applicability of an isobaric model simulating the formation of
Λ-hyperons in π p-interactions. IAd. fiz. 1 no.6:1101-1105
Je '65.   (MIRA 18:6)

1. Ob"yedinennyy institut yadernykh issledovaniy.

L 26609-65   EWT(1)/EWG(v)/EEC-4/EEC(t)   Po-5/Pq-4   GW
8/0033/65/042/001/0117/0120

ACCESSION NR: AP5006005

AUTHOR: Moroz, V. I.; Boyko, P. N.

TITLE: Infrared brightness of the solar aureole and the thermal radiation of interplanetary dust

SOURCE: Astronomicheskii zhurnal, v. 42, no. 1, 1965, 117-120

TOPIC TAGS: solar aureole, interplanetary dust, sky brightness, day sky infrared observations

ABSTRACT: Observations of the infrared brightness of the day sky near the sun made in January 1964 at Bol'shoye Alma-Atinskoye Lake (3060 m above sea level) with a diffraction spectrometer established that the upper limit of density of interplanetary dust is $4 \cdot 10^{-21}$ g·cm^{-3} at a distance of 0.05 A.U. Table 1 gives the absolute values of sky brightness obtained. The aureole was not observed to concentrate towards the ecliptic. In addition, the measured aureole brightnesses were less than those obtained earlier by A. I. Lazarev in Leningrad   (Astron. zh., 41, 366, 1964). Thus, Lazarev's conclusion to the effect that an interplanetary component is present in the infrared brightness of the sky near the sun is refuted.   [DM]
Orig. art. has: 2 figures and 7 formulas.

Card 1/3

L 26609-65
ACCESSION NR: AP5006005

ASSOCIATION: Gos. Astronomicheskiy in-t im. P. K. Shternberga (Gos. Astronomical in-t); Astrofizicheskiy in-t Akademii nauk KazSSR (Astrophysical in-t, Academy of Sciences, KazSSR)

SUBMITTED: 05May64   ENCL: 01   SUB CODE: AA

NO REF SOV: 005   OTHER: 002   ATD PRESS: 3188

Card 2/3

L 26609-65
ACCESSION NR: AP5006005

Table 1.
Absolute sky brightness (w·cm⁻²·ct⁻¹·µ) at λ 2.2 and λ 3.3,
according to measurements made at Boi above Alma-Atinskoye lake
(3060 m above sea level)

Date	λ,µ	angular distance from the sun (almucanthar of the sun)							Zenith	Zenithal distance of the Sun
		2°	4°	6°	8°	10°	30°	90°		
								6·10⁻⁴	—	62—63°
25.I.1964	2.2	1.4·10⁻⁴	1.2·10⁻⁴	—	4·10⁻⁴	—	3·10⁻⁴	2·10⁻⁴	65
26.I.1964	2.2	1.3·10⁻⁴	9·10⁻⁴	—	—	6·10⁻⁴	6.5·10⁻⁴	3·10⁻⁴	64
27.I.1964	2.2	1.1·10⁻⁴	8.4·10⁻⁵	4·10⁻⁵	3·10⁻⁵	—	1·10⁻⁴		61—63
29.I.1964	2.2	1.0·10⁻⁴	8·10⁻⁵	—	—	—	1.2·10⁻⁴	3·10⁻⁴	62
30.I.1964	3.3	~10⁻⁵				1.1·10⁻⁴	6·10⁻⁵		61
1.II.1964	2.2	2·10⁻⁴	1.8·10⁻⁴	1.5·10⁻⁴	1.3·10⁻⁴				

Card 3/3

L 10905-66   /EWT(1)   GW

ACC NR: AP6002695   SOURCE CODE: UR/0033/65/042/006/1287/1295

AUTHOR: Moroz, V. I.

ORG: State Astronomical Institute im. P. K. Shternberg (Gosudarstvennyy astronomi-cheskiy institut)

TITLE: Infrared spectrometry of the moon and the Galilean satellites of Jupiter

SOURCE: Astronomicheskiy zhurnal, v. 42, no. 6, 1965, 1287-1295

TOPIC TAGS: infrared spectrophotometry, moon, Galilean satellite, Jupiter, lunar surface, selenography, Ganimed, Europa lunar albedo

ABSTRACT: The results are presented of infrared observations of select areas of the full moon made at the Yuzhnaya Station of the State Astronomical Institute imeni Shternberg in October 1963. The station's 125-cm reflector was used in con-junction with a prismatic spectrometer and 0.5 x 0.5-mm lead sulfide photoresistor cooled by liquid nitrogen to compare the spectrophotometric properties of select areas in the 0.8—3.8 μ spectral interval. The observed increase of albedo with wavelength up to 2.2 μ was found to be approximately identical for all the areas investigated, including maria, continents, and bright craters. Among terrestrial materials volcanic ash and slag show a similar dependence of albedo on wavelength. Thermal radiation in the 3—4 μ region was observed to make a substantial contri-bution. The temperature of the subsolar point, as derived from the thermal excess, is 395K. Using the same spectrometer with both the 125-cm and 260-cm reflectors,

Card 1/2   UDC: 523.45.37

L 10905-66

ACC NR: AP6002695

the spectra of the Galilean satellites in the 0.8—2.5 μ region were obtained. The records of Europa and Ganimed show details characteristic of the reflection spectrum of a snow layer, suggestive, therefore, of the existence of atmospheres. Orig. art. has: 5 formulas, 13 figures, and 5 tables. [DM]

SUB CODE: 03/ SUBM DATE: 17Jun65/ ORIG REF: 014/ OTH REF: 005/ ATD PRESS: 4170

Card 2/2

L 21640-66   EWT(1)/   GW

ACC NR: AP6006773   SOURCE CODE: UR/0033/66/043/001/0063/0072

AUTHOR: Moroz, V. I.

ORG: State Astronomical Institute im. P. K. Shternberg (Gos. astronomicheskiy in-t)

TITLE: Infrared spectra of stars (λ 1—2.5μ)

SOURCE: Astronomicheskiy zhurnal, v. 43, no. 1, 1966, 63-72

TOPIC TAGS: star, infrared spectrum, absorption spectrum, giant star

ABSTRACT: The spectra of 19 stars with brightness ranges from A1 to M7 were obtained with a resolving power from 10 to 1500. The strongest resolution was obtained in the α-Ori spectra. Part of the spectral recordings, both single and average, of the 19 stars is shown, and strong absorption lines are found in the wavelength region 1.5μ to 2μ in the spectra of the long-period variables (o Cet, R Aql, R Aqr, X Oph). These apparent H_2O stellar bands are observed near the minima of the spectral recordings. A large number of fine absorption details are found in the region 1.5—1.7μ of the K2-M5 giants as well as a fringe at 2.30μ due to CO. Energy distribution curves are also given for the

Card 1/2

UDC: 523.87

L 21640-66

ACC NR: AP6006773

red giants, showing a maximum at 1.6 μ apparently due to H^- and H_2^- ions. Most of the above results were obtained by means of a diffraction spectrometer with a 300 lines/mm grid (40 $\overset{\circ}{A}$/mm dispersion). Orig. art. has: 12 figures and 3 tables.

SUB CODE: 03/ SUBM DATE: 17Jun65/ ORIG REF: 002/ OTH REF: 018

Card 2/2.

L 06204-67   EWT(1)   GW

ACC NR: AP6019671   SOURCE CODE: UR/0033/66/043/003/0579/0592

AUTHOR: Moroz, V. I.

27
F

ORG: State Astronomical Institute im. P. K. Shternberg (Gosudarstvennyy astronimicheskiy institut)

TITLE: The spectra of Jupiter and Saturn in the region 1--2.5 microns

SOURCE: Astronomicheskiy zhurnal, v. 43, no. 3, 1966, 579-592

TOPIC TAGS: planet, astronomy, Jupiter, Saturn, spectrographic analysis, astrophysics

ABSTRACT: Spectral measurements of Saturn's and Jupiter's rings were obtained with resolution $\lambda/\Delta\lambda \approx 500$, 150, and 20 respectively in the region 1 - 2.5 μ. The greatest share of the observations was conducted on the 125-cm reflector of the South Station of the State Astronomy Institute, and a small portion of the Saturn observations was made on the 2.6-m reflector of the Crimean Observatory. Additional details are given on the photographic equipment, spectra recording devices, prisms, etc. The spectra of Jupiter are separately plotted in the regions 1.1--2.5 μ, 0.95--1.3 μ, 1.45--1.65 μ, and 1.08--1.63 μ. These readings are compared with laboratory spectra of CH_4 and NH_3 under various pressures. The chemical content of Jupiter is tabulated on the basis of the current spectroscopic observations, the work of other observers, and on the basis of certain assumptions. Corresponding data are given for the Saturn

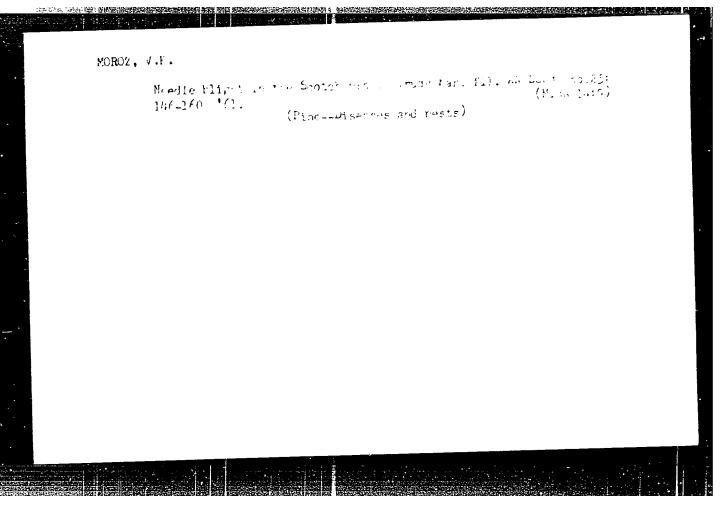Card 1/2   UDC: 523.45

ACC NR: AP6019671

studies. Analysis of the data is made with the assumption of optical equivalency of the cloud border with the solid surface. The author notes that the CH_4 abundance above Jupiter's cloud layer is apparently less than 150 m atm. Considerable contribution to absorption near $2\,\mu$ is probably given by the H_2 band 1 - 0. The total pressure is about 2 atm. Saturn's cloud layer apparently consists of CH_4 ice particles and rings of H_2O ice particles. Orig. art. has: 12 figures, 17 equations, and 2 tables.

SUB CODE: 03/ SUBM DATE: 17Jun65/ ORIG REF: 008/ OTH REF: 033

Card 2/2 afs

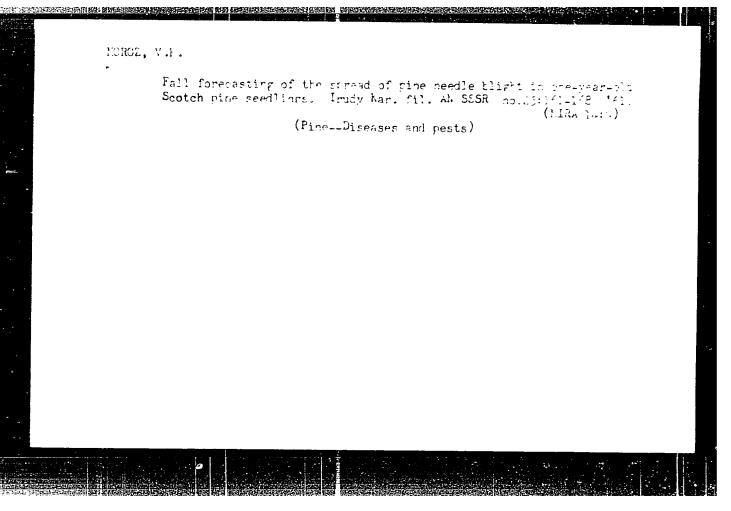KOLOZ, V. K.

Cotton-Picking Machinery

Testing cotton picker ShKh-2,1. Sel'khozmashina, No. 1, 1952.

Monthly list of Russian Accessions, Library of Congress, December 1952. Unclassified.

Porter, V. L.

Lorez, V. L. - "National Institute of Harvesting Cotton in the Non-Irrigated Cotton-Growing Regions." In Higher Education of Agricultural Agricultural Inst. Kirovabad, 1957 (Dissertation for the Degree of Candidate in Agricultural Sciences).

So: Knizhnaya Letopis', No. 4, 1957, pp. 1-57

MOROZ, V.F.

Needle Flight in the Scotch ... magnetar. fil. ... Soot ... (M... 1...)
146-160 '61.   (Plac--Diseases and rests)

MOROZ, V.F.

Fall forecasting of the spread of pine needle blight in pre-year-old
Scotch pine seedlings. Trudy kar. fil. AN SSSR   no.23:164-178 '61.
(MIRA 14:10)

(Pine--Diseases and pests)
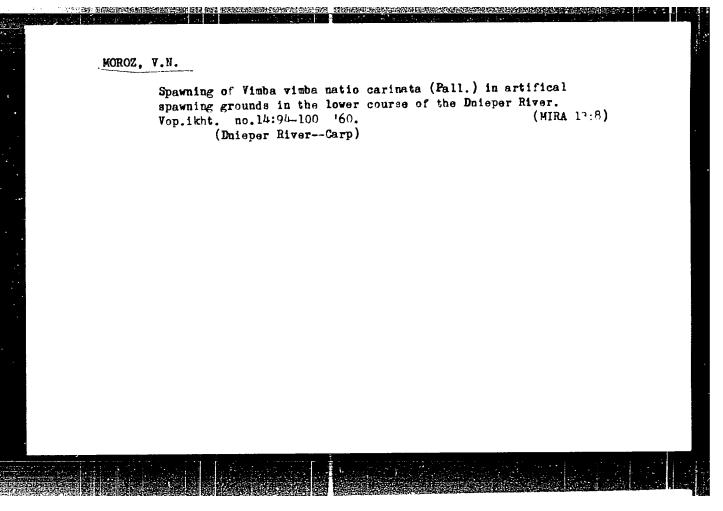
KORYAKIN, I.S.; ALEKSEYEVA, V.G.; GOVOROVA, M.S.; VORONINA, T.V.;
DAULBAYEV, F.A.; DEMIDOVA, S.I.; KAZANTSEVA, G.V.; MOROZ, V.M.;
MUKHINA, N.S.; PIPIN'YAN, P.O.; SHTIFANOVA, A.K.

Trace elements in drinking water sources of Kazakhstan and their
relations to the problem of some noninfectious diseases. Vest. AMN
SSSR 19 no.7:90-95 '64.   (MIRA 18:3)

1. Alma-Atinskiy meditsinskiy institut.

MOROZ, V.N.

Spawning of Vimba vimba natio carinata (Pall.) in artifical
spawning grounds in the lower course of the Dnieper River.
Vop.ikht. no.14:94-100 '60.   (MIRA 13:8)
        (Dnieper River--Carp)

L 02989-67   EWT(d)/EWP(1)   IJP(c)   BB/GG

ACC NR: AP6033625   SOURCE CODE: UR/0102/66/000/005/0063/0066

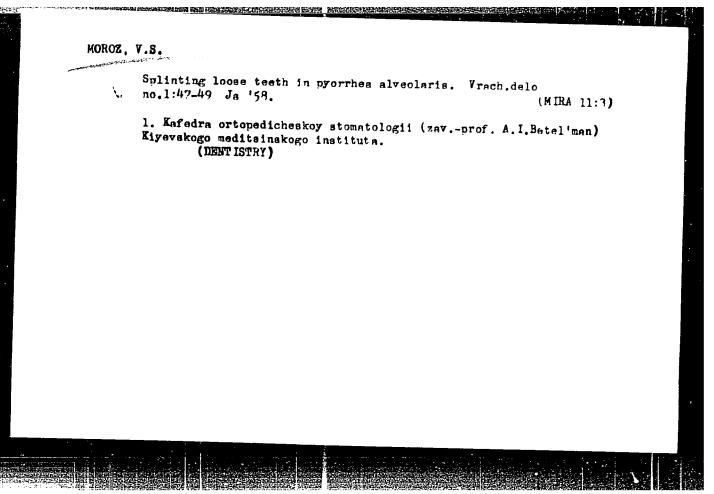AUTHOR: Kozubovs'kyy, S. F. (Kiev); Khartebrot, H. (Kiev); Moroz, V. M. (Kiev)
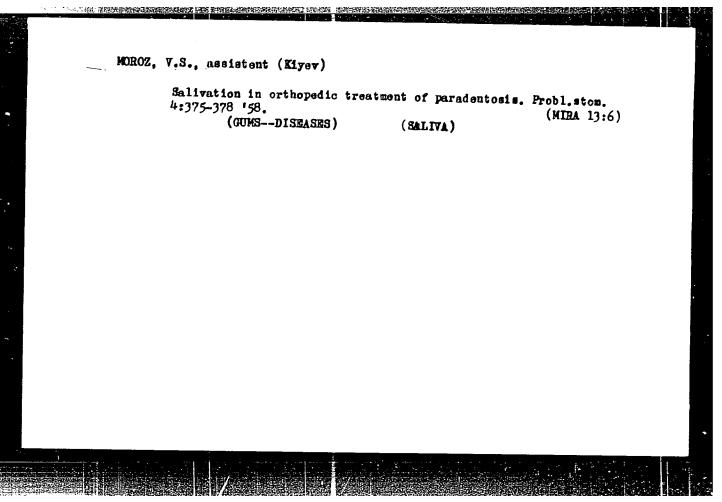
ORG: none

TITLE: Digital readout

SOURCE: Avtomatyka, no. 5, 1966, 63-66

TOPIC TAGS: data readout, computer output unit, BINARY CODE

ABSTRACT: A simple and reliable four-digit readout unit has been developed.   The
unit includes a diode decoding matrix for translating binary-coded decimal signals
into decimal code and MTKh-90 cold-cathode thyratrons for driving an IN-1 display tube
and number memorizing.   Power consumption is only 1 w per digit at the rated voltage
of 380 ± 100 v.   During testing the device operated reliably even at voltages of
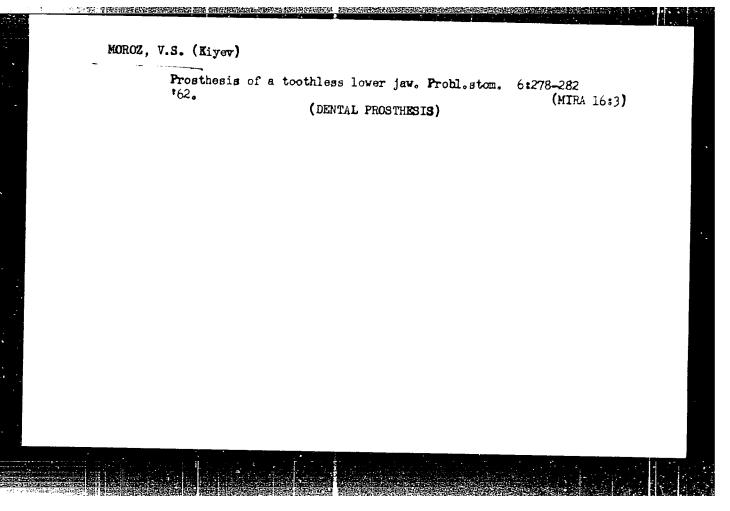220 v—600 v.   Orig. art. has: 3 figures.

SUB CODE: 09/   SUBM DATE: 02Apr66/   ORIG REF: 010/   ATD PRESS: 5099

1

MOROZ, V.S.

Splinting loose teeth in pyorrhea alveolaris. Vrach.delo
no.1:47-49 Ja '58.
(MIRA 11:3)

1. Kafedra ortopedicheskoy stomatologii (zav.-prof. A.I.Betel'man)
Kiyevskogo meditsinskogo instituta.
(DENTISTRY)

MOROZ, V.S., assistent (Kiyev)

Salivation in orthopedic treatment of paradentosis. Probl.stom.
4:375-378 '58.
        (GUMS--DISEASES)   (SALIVA)   (MIRA 13:6)

MOROZ, V. S.: Master Med Sci (diss) -- "Orthopedic measures in the complex treatment of paradontosis". Kiev, 1959. 15 pp (Kiev Order of Labor Red Banner Med Inst im A. A. Bogomolets), 200 copies (KL, No 18, 1959, 120)

MOROZ, V.S. (Kiyev)

Prosthesis of a toothless lower jaw. Probl.stom. 6:278-282
'62.
(DENTAL PROSTHESIS)   (MIRA 16:3)

L 15161-65   EWT(m)/EWA(d)/EWP(t)/EPR/EWP(k)/EWP(b)   Pf-4/Ps-4   IJP(c)/
ASD(m)-3   JD/HW

ACCESSION NR: AT4018354   S/3000/64/000/008/0130/0135

AUTHOR: Sogrishin, Yu. P. (Candidate of technical sciences); Suvorov, F. G.;
(Engineer); Moroz, V. Ya. (Engineer)

TITLE: High-velocity sheet metal stamping using rubber   *B*

SOURCE: Moscow. Eksperimental'nyy nauchno-issledovatel'skiy institut kuznechno-
pressovogo mashinostroyeniya. Nauchnyye trudy*, no. 8, 1964. Novoye v kuznechno-
shtampovochnom proizvodstve (Latest developments in the forging industry), 130-135

TOPIC TAGS: metal stamping, sheet metal forging, rubber die, aluminum alloy
forging, stainless steel forging

ABSTRACT: The authors briefly list the advantages and disadvantages of stamping
sheet-metal stock using rubber. They note that in the majority of cases the
rubber pads have to be shaped by hand. The results of an investigation carried out
in order to assess the technological potentialities of high-speed stamping of
sheet-metal blanks using rubber are then described. Aluminum alloy and stainless
steel sheets were used. The rubber employed was in the form of a disk 0.207 m in
diameter and 0.07 m in thickness. The velocities of deformation for forming opera-
tions were 15-20 m/sec and the energy of impact was about 5880 joules. In punching
operations, the velocities used were equal to 8-10 and 15-20 m/sec; the impact
Card   1/3

L 15161-65

ACCESSION NR: AT4048354

energy was, on the average, 1420 and 5690 joules, respectively. The mechanical properties of the rubber used in the experiments are tabulated and photographs of some stamped specimens are shown. The edges of the contour and of the punched holes were smooth. The following forming operations were then investigated: flanging, extrusion and extraction. The main purpose of these tests was to compare the degree of folding, the accuracy of relief shaping, and the magnitudes of the flanging and extrusion factors for various deformation velocities. The features of high-speed stamping using rubber are as follows: during impact, high specific pressures are developed briefly (they are greater the smaller the degree of deformation for the same impact energy). The high value of the specific pressures obtained decreases flanging, thus improving the relief and the accuracy of stamping. At the same time, the high impact velocities make it impossible to concentrate folds in separate places on the blank, leading instead to the formation of numerous shallow, uniformly distributed, folds. High-velocity pressing using rubber makes it easier to shape the blank, to obtain higher borders and relatively complex configuration of detail as well as a high accuracy of the stamped parts. In cutting operations, the high specific pressures obtained make it possible to obtain small chamfering radii in the corners. The durability of the rubber disk was found to be satisfactory. The increased velocity of deformation using rubber makes it possible to widen the technological potentialities of stamping operations. Orig. art. has: 3 figures and 3 tables.
Card 2/3

L 15161-65

ACCESSION NR: AT4048354

ASSOCIATION: Eksperimental'nyy nauchno-issledovatel'skiy institut kuznechno-pressovogo mashinostroyeniya, Moscow (Experimental Scientific Research Institute of Forging Machinery)

SUBMITTED: 00   ENCL: 00   SUB CODE: IE, MM

NO REF SOV: 002   OTHER: 000

Card 3/3

L 15998-65   EWT(m)/EWA(d)/EWP( )/EWP(b)   Pf-4/Pad   IJP(c)/RAEM(e)/SSD/
AFWL/ASD(f)-2/ASD(m)-3/AFMD(c)/AFTC(p)   MJW/JD/RW/JG
ACCESSION NR: AP4049116   S/0182/64/000/011/0009/0011

AUTHOR: Sogrishin, Yu. P.; Popov, A. V.; Moroz, V. Ya.

TITLE: Effect of high deformation rates on ductility in the upsetting
of metals

SOURCE: Kuznechno-shtampovochnoye proizvodstvo, no. 11, 1964, 9-11

TOPIC TAGS: aluminum alloy, magnesium alloy, beryllium alloy, tita-
nium alloy, carbon steel, stainless steel, tool steel, ductility,
deformation rate, temperature effect

ABSTRACT: To determine the effect of high deformation rates on duc-
tility, several industrially important Al, Mg, Ni, Ti, and Be alloys
and steels were subjected to cold and hot explosive upsetting at
rates of 25, 50, and 100 m/sec. In some experiments, the impact
energy (930, 3650, or 14,700 J) of the striking head greatly exceeded
that necessary for deforming the specimen. In other experiments, the
impact energy of the striking head was calculated to deform the spec-
imens before the first signs of failure had appeared. Experiments
showed that increasing the deformation rate to 100 m/sec significantly

Card 1/2

L 15998-65
ACCESSION NR: AP4049116

affects the ultimate deformation of ductile metals and alloys at room
temperature. In their reaction to an increase in the deformation
rate, the metals investigated can be divided into three groups,
according to which the ductility of 1) AK6, AK8, AMg6, and AB alumi-
num alloys increases 15—20%, 2) Kh18N9T (AISI 321) stainless steel,
EI437A alloy (AISI Nimonic 80A), and VT1 titanium alloy decreases by
40%, and 3) construction and tool steels remains unchanged. In metals
which have low ductility at low deformation rates, ductility remains
unchanged with an increase in the deformation rate. In upsetting
metals heated to their upsetting temperatures, ductility usually does
not decrease and, in most cases, is practically unlimited (the ulti-
mate deformation exceeds 90—95%). An exception are the nickel-based
heat-resistant alloys, whose ductility decreases slightly with an in-
crease in the deformation rate. Orig. art. has: 2 figures and 2
tables.

ASSOCIATION: none

SUBMITTED: 00   ENCL: 00   SUB CODE: MM, AS

NO REF SOV: 003   OTHER: 000   ATD PRESS: 3146
Card 2/2

L 39885-66   EWT(m)/EWP(k)/EWP(t)/ETI   IJP(c)   JH/JD/HW/GD-2

ACC NR: AP6016576   (N)   SOURCE CODE: UR/0182/66/000/005/0008/0012

AUTHOR: Sogrishin, Yu. P.; Zhuchenko, A. N.; Moroz, V. Ya.

ORG: none

TITLE: Inertial forces in extrusion with high-velocity metal flow

SOURCE: Kuznechno-shtampovochnoye proizvodstvo, no. 5, 1966, 8-12

TOPIC TAGS: metal, metal forging, metal extrusion, impact extrusion, high energy rate forming, metal forming

ABSTRACT: High-energy-rate forming (HERF) makes it possible to extrude complex shaped parts such as turbine blades from low-plasticity alloys which, under conditions of conventional extrusion (in presses) at metal flow velocities of 0.1—1.5 m/sec, are highly susceptible to cracking. The initial velocity of metal flow in HERF could be as high as 300 m/sec. At such velocities, the momentum of the extruded portion may reach a magnitude sufficient to tear away this portion from the rest of the material, or at least to cause necking. Mathematical analysis established that the permissible flow velocity depends on the metal strength, extrusion tem-perature and extrusion ratio, and at an extrusion ratio of 10:1 varies from 209 m/sec for aluminum alloys to 215 m/sec for carbon steels. Experiments with HERF extrusion of AK6, V95, AMg3, AMg6 aluminum alloys, VT3-1 titanium alloy, 45 carbon steel and

Card 1/2   UDC: 621.777.2

L 39885-66

ACC NR: AP6016576

5

1Kh13, Kh18N9T, EI696, and EI827 stainless steels yielded results which agreed very well with those of mathematical calculations. Orig. art. has: 3 figures, 2 tables, and 13 formulas.

[DV]

SUB CODE: 13/   SUBM DATE: none/   ORIG REF: 003/   ATD PRESS: 5008

Card   2/2   pl S

MOROZ, Wladyslaw, mgr.inz.

The selection of the optimal type of power plant for ships.
Przegl techn 31 no.13:10-12 Mr '60.

MOROZ, Wladyslaw, mgr., inz.

Pescara's heat balance system. Bud ekretowe Warszawa 7 no.1:8-10
'62.

1. Politechnika Gdanska.

(Ship propulsion)   (Gas turbines)

MOROZ, Wladyslaw, mgr.,inz.

Internal combustion engines for ships produced by the "Zgoda" Technical Installations Plant. Bud okretowe Warszawa 7 no.2: 44-47 '62.

1. Politechnika Gdanska, Redaktor dzialowy miesiecznika "Budownictwo okretowe"

MAZGAJSKI, Jerzy, mgr inz.; ADAM, Wlodzimierz, doc. mgr. inz.

Fluctuating temperatures in resistance chamber ovens and methods of reducing the fluctuation.   st elektrotech prace 11 no.33:63-68 '67

1. Zaklad Maszyn Elektrycznych, Instytut Elektrotechniki, Warszawa.

MOROZ, WLODZIMIERZ

Moroz, Wlodzimierz.   Encyklopedia maszyn elektrycznych. Warszawa,
Panstwowe, Panstwowe Zaklady Zydawn. Szkolynch, 1951. 194 p.
(Encyclopedia of Electrical machines)

SO: Monthly list of East European Accessions, LC, Vol. 3, No. 1,
Jan. 1954, Uncl.

GAWUC, Wladyslaw, mgr. inz; MOROZ, Wlodzimiers, doc.mgr. inz.

Durability evaluation of insulating systems of electric
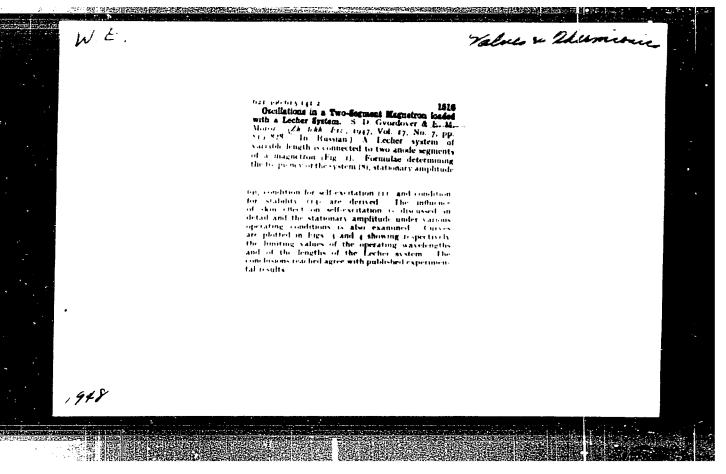machines based on functional tests of thermal resistance.
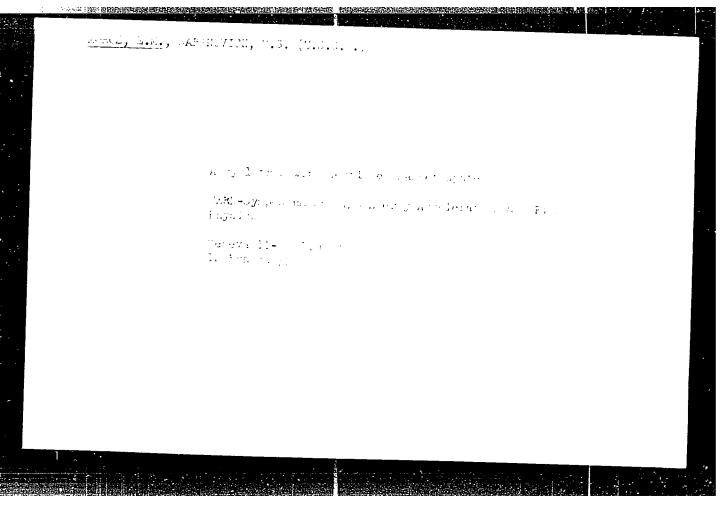Inst. elektrotech. prace 11 no.34; 17-36 '63.

1. Zaklad Maszyn Elektrycznych, Instytut Elektrotechniki,
Warszawa.

MOROZ, Wlodzimierz, doc. inz.

Development trends in designing electric machines. Przegl
elektrotechn 39 no.2:45-49 F '63.

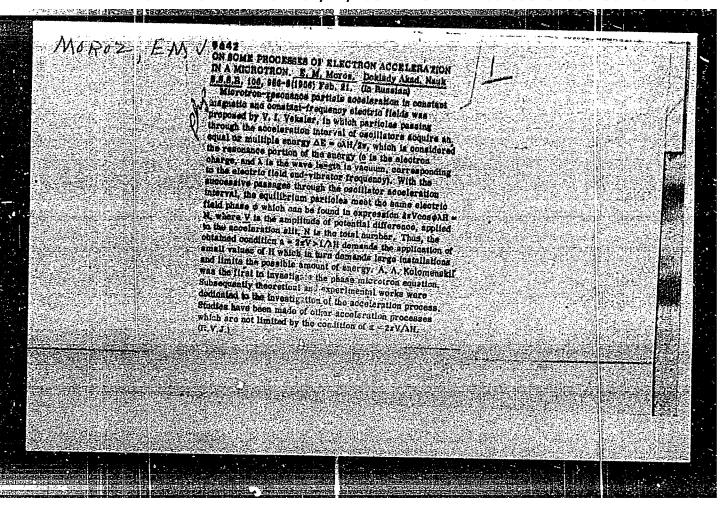1. Instytut Elektrotechniki, Zaklad Maszyn Elektrycznych,
Warszawa.

W. E.

Valves & Electronic

Oscillations in a Two-Segment Magnetron loaded with a Lecher System. S. D. Gvozdover & E. M. Mazur (*Zh. tekh. Fiz.*, 1947, Vol. 17, No. 7, pp. 879, 898. In Russian.) A Lecher system of variable length is connected to two anode segments of a magnetron (Fig. 1). Formulae determining the frequency of the system (5), stationary amplitude

(6), condition for self-excitation (1) and condition for stability (12) are derived. The influence of skin effect on self-excitation is discussed in detail and the stationary amplitude under various operating conditions is also examined. Curves are plotted in Figs. 3 and 4 showing respectively the limiting values of the operating wavelengths and of the lengths of the Lecher system. The conclusions reached agree with published experimental results.

1948

MOROZ, Ye.M., nauchnyy sotrudnik.

Particle accelerators. Nauka i zhizn' 23 no.7:17-20 Jl '56.
(MIRA 9:9)
1.Fizicheskiy institut imeni P.N.Lebedeva Akademii nauk SSSR.
(Particle accelerators)

MOROZ, E.M.

9842

ON SOME PROCESSES OF ELECTRON ACCELERATION IN A MICROTRON. E. M. Moroz, Doklady Akad. Nauk S.S.S.R., 106, 984-9 (1956) Feb. 21. (In Russian)

Microtron-resonance partials acceleration in constant magnetic and constant-frequency electric fields was proposed by V. I. Veksler, in which particles passing through the acceleration interval of oscillators acquire an equal or multiple energy $\Delta E = e\lambda H/2\pi$, which is considered the resonance portion of the energy (e is the electron charge, and λ is the wave length in vacuum, corresponding to the electric field and vibrator frequency). With the successive passages through the oscillator acceleration interval, the equilibrium particles meet the same electric field phase ϕ which can be found in expression $\Delta r V\cos\phi\lambda H = N$, where V is the amplitude of potential difference, applied to the acceleration slit, N is the total number. Thus, the obtained condition $a = 2\pi V > L/\lambda H$ demands the application of small values of H which in turn demands large installations and limits the possible amount of energy. A. A. Kolomenskii was the first to investigate the phase microtron equation. Subsequently theoretical and experimental works were dedicated to the investigation of the acceleration process. Studies have been made of other acceleration processes which are not limited by the condition of $a = 2\pi V/\lambda H$. (G.V.J.)

SUBJECT   USSR / PHYSICS   CARD 1 / 2   PA - 1388
AUTHOR   MOROZ, E.M.
TITLE   A Cyclotron with a Magnet which is Cut Apart
PERIODICAL Dokl.Akad.Nauk, 108, fasc. 3, 436-439 (1956)
            Issued: 8 / 1956   reviewed: 10 / 1956

This work describes the principle for the construction of such a magnet and in-
vestigates the stability of the motion of particles and the resonances   At
first an expression for the duration of the revolution of a particle with the
energy E is given: $T = (2\pi E/ceH) + (Nl/v)$. Here l denotes the length of the in-
terval between the magnet sectors, v - velocity of the particle, c - velocity
of light, e - charge of the electron, $E_o = m_o c^2$ - rest energy of the particle
The modification of the time needed by a particle for passing through the magnet
sector (first segment) can be compensated by a corresponding modification of the
duration of the passage through the interspace of the sectors (second segment)
The corresponding energy dependence of l is computed. With increasing energy
l at first increases and later diminishes. The maximum is at about

$$(E/E_o)^3 = TceH/2\pi E_o.$$

The vertical focussing of the particles is brought about by a declining magnetic
field on the boundaries of the magnetic sectors. The limits of vertical focus-
sing may be extended considerably by the use of unsymmetrical sectors. The in-
clinations of the sector boundaries can be chosen in such a manner that one of
the angles between the particle orbit and the normal to the sector boundary is
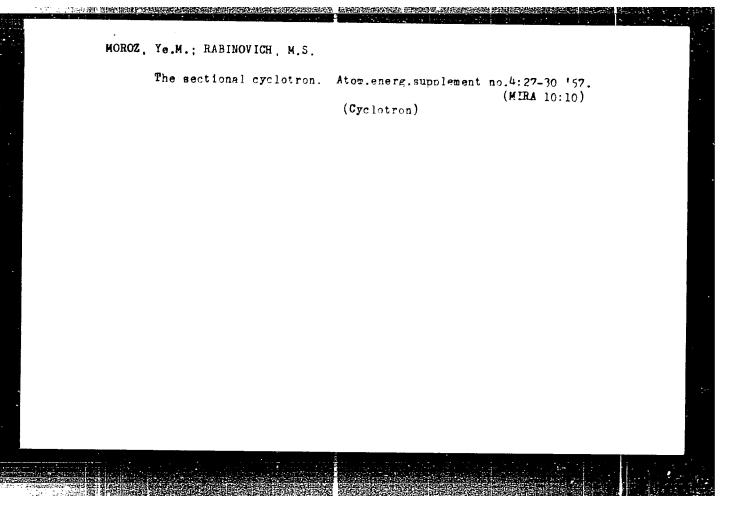
PARTICLE ACCELERATORS: CYCLOTRON

"Increasing the Limiting Energy and Improving the Focusing in a Cyclo-
tron", by Ye.M. Moroz and M.S. Rabinovich, Physics Institute imeni P.N.
Lebedev, Academy of Sciences USSR, Pribory i Tekhnika Eksperimenta,
No 1, January-February 1957, pp 15-21.

Discussion of a sectionalized magnetic system for cyclotrons with
constant frequency. It is proposed that the ratio of the homogeneous
magnetic fields in the neighboring sectors has a constant value.
The necessary ratio of the frequency of rotation to the energy and
the required focusing of the particles can be insured by choosing the
corresponding shapes of the limits of the sectors of the field. A ra-
tional choice of the coefficient x eliminates the passage through the
most harmful resonances of the betatron oscillations. The proposed
magnetic system makes it possible to extend the range of cyclotron
energies by several hundreds of Mev, improve the orbit stability in
ordinary cyclotrons, to attain higher beam intensity, and reduce the
amplitude of the radio-frequency voltage on the dees of the cyclo-
tron. Reference is made to work by Judd (Physical Review, 1955, 100,
1804),

Card 1/2

MOROZ, Ye.M.; RABINOVICH, M.S.

The sectional cyclotron. Atom.energ.supplement no.4:27-30 '57.
(MIRA 10:10)
(Cyclotron)

SUBJECT: USSR/Photographing Nuclear Processes   25-5-22/35

AUTHOR: Moroz, B.M., Scientific Contributor to the Physical Institute
               Imeni P.N. Lebedev of the USSR Academy of Sciences

TITLE: Bubble Camera (Puzyr'kovaya Kamera)

PERIODICAL: Nauka i Zhizn' - May 1957, No 5, p 50 (USSR)

ABSTRACT: Bubble cameras are used for photographing nuclear processes
               moving at extremely high speed. In the camera the charged
               particles move about in a liquid. The traces left by these
               particles have the form of chains consisting of minute steam
               or gas bubbles. The efficiency of a steam or gas camera is
               estimated by the number of nuclear processes it is able to
               register.

               A new type of bubble camera was recently developed in the USSR
               by scientists E.V. Kuznetsov, M.F. Lomanov, G.A. Blinov and
               Khuan Shen-Nyan. It registers up to 10 percent of all part-
               icles passing through the camera, which makes it possible to
               use it for the investigation of cosmic rays.

Card 1/2

TITLE: Bubble Camera (Puzyr'kovaya Kamera)   25-5-22/35

ASSOCIATION: Institute of Physics Imeni P.L. Lebedev

PRESENTED BY:

SUBMITTED:

AVAILABLE:

Card 2/2

AUTHOR: Moroz, Ye.M.   25-8-32/42

TITLE: Rays Kill Microbes (Luchi ubivayut mikrobov)

PERIODICAL: Nauka i Zhizn', 1957, # 8, p 52 (USSR)

ABSTRACT: During the last few years, ionizing radiation has frequent-
                 ly been applied in the sterilization of various substances.
                 This method has proved to be very useful as far as medicine,
                 drugs and surgical equipment is concerned. A method to de-
                 stroy the microbes completely would require an immense dose
                 of radiation, which would be too expensive. Too much ex-
                 posure by the rays could even have a negative effect on the
                 quality of the materials. Therefore, especially with regard
                 to foodstuffs, smaller doses have recently been applied,
                 thereby pasteurizing the products and increasing their period
                 of preservation by 3-5 and more times. In 1955, Soviet scien-
                 tist G. Askar'yan, in the field of criminal medicine, sug-
                 gested a method of preserving corpses by radiation during the
                 time of criminal investigation.

AVAILABLE: Library of Congress

Card 1/1

56-5-45/46

AUTHOR: Moroz, Ye.M.

TITLE: On the Influence Exercised by the Quantum Fluctuations of
             Electron Radiation in Synchrotron Oscillations (O vliyanii
             kvantovykh fluktuatsiy izlucheniya elektronov na sinkhro-
             tronnyye kolebaniya)

PERIODICAL: Zhurnal Eksperim. i Teoret. Fiziki, 1957, Vol. 33, Nr 5,
             pp. 1309-1310 (USSR)

ABSTRACT: The well-known results obtained by Sand (ref. 3) are augmented
             by the fact that the damping of synchrotron oscillations due to the
             increase of the electron energy is taken into account. For the
             average value of the square of the amplitude of the synchrotron
             oscillation the expression:

$$\langle A_\varphi^2 \rangle = \frac{55\sqrt{3}}{32} \cdot \frac{\hbar c q c \, tg \, \varphi}{e^2 (1+\lambda)^2 (3-4m)} \cdot F_1 \, F_2$$

with $F_1 = \left(1 + \alpha \frac{1}{3-4m} \cdot \frac{\dot{E}}{P}\right)^{-1}$, $F_2 = \left(1 + \frac{\dot{E}}{P}\right)^{-1}$, $P = \frac{2 c e^2}{3 R^2} \cdot \frac{E^4}{1+\lambda}$

Card 1/2   is derived.

On the Influence Exercised by the Quantum Fluctuations of Electron   56-5-45/46
Radiation in Synchrotron Oscillations

At energies of some 100 MeV F_1 and F_2 play an important part and are responsible for the dependence of the expression $\langle A \varphi^2 \rangle$. There are 4 references, 1 of which is Slavic.

ASSOCIATION. Physics Institute imeni P.N.Lebedev AN USSR (Fizicheskiy institut im. P.N.Lebedeva AN SSSR)

SUBMITTED: August 10, 1957

AVAILABLE: Library of Congress

Card 2/2

H ι κ ι ‿, Ye M

20-1-20/54

AUTHOR: Moroz, Ye. M.

TITLE: New Possibilities of Increasing the Efficiency of Accelerators
of Charged Particles
(O novykh vozmozhnostyakh povysheniya effektivnosti uskoriteley
zaryazhennykh chastits)

PERIODICAL: Doklady Akademii Nauk SSSR, 1957, Vol. 115, Nr 1, pp. 78 - 79
(USSR)

ABSTRACT: The present work suggests a new type of accelerators with mag-
netic fields constant in time, that is to say with accelerators
with steadily touching trajectories of the particles. The mag-
netic system of these accelerators consists of 3 or more sectors
with homogeneous magnetic fields. A possible variant of this
system is shown by means of sketch. The magnet consists of four
sectors of the same magnetic field intensity $H_1 = H_2 = H_3 = H_4 = H$.
There is no magnetic field in the intervals between the sectors.
In one of the intervals, at point A, through which pass the tracks
for the particles with random energy, there is the accelerating
element with small dimensions. The stationarity of the motion of
the particles is secured by the effect of the magnetic boundary
field at the points where the particle enters and leaves the
magnetic sectors. The frequencies ω_z of the vertical and the

Card 1/3

20-1-20/54

New Possibilities of Increasing the Efficiency of Accelerators of Charged
              Particles

frequencies ω of the horizontal betatron oscillations depend on
 the rotational angle φ_1 of the particles in the first sector,
on the inclination rake angle of the boundary of the second
sector toward the line of symmetry of the magnetic system as well
as on the straight interval between the symmetrical halves of
the magnetic system as well as on some other factors. Thus the
duants of the cyclotron can be replaced by small accelerating
elements and the power necessary for the feed of the magnet and
of the radar-frequency system can be reduced. Furthermore the
intensity of the bundle of accelerated ions can be increased by
focusing. The rotation period of ions can be kept constant to
very great energies. Here the number of possible resonances is
smaller than with earlier apparatuses. The energy of the leaving
bundle can be changed by means of translatory motion of the out-
let-device in the space between the sectors. The magnetic system
observed here can obviously be used in phasotrons (synchro-cyclo-
trons). The magnetic systems suggested here are of special im-
portance for microtrons. Various possibilities in this direction
Card 2/3   are shown. There is 1 figure.

20-1-20/54

New Possibilities of Increasing the Efficiency of Accelerators of Charged
          Particles

ASSOCIATION: Physics Institute im. P. N. Lebedev, USSR Academy of Sciences
               (Fizicheskiy institut im. P.N. Lebedeva Akademii nauk SSSR)

PRESENTED BY: D.V. Skobel'tsyn, Academician, February 27, 1957

SUBMITTED: February 2o, 1957

AVAILABLE: Library of Congress

Card 3/3

MOROZ, Ye. V. Cand Phys-Math Sci -- (diss) "Theoretical study of methods
of ~~the increase of~~ the effectiveness of ~~cyclotrons~~." Mos, 1956. 16 pp

(Acad Sci USSR. Physics Inst im P. N. Lebedev). 125 copies. Bibliography:
pp 15-16 (19 titles). (KL, 14-57, 90)

-10-

HIGH-ENERGY NUCLEAR PHYSICS: PARTICLE ACCELERATORS (SYNCHROTRONS)

An investigation of the energy dependence of the amplitude of syn
chroton oscillations caused by fluctuations in the radiation. A simple
stationary solution is obtained for the phase equation, applicable
with sufficient practical accuracy to all large synchrotons. It is
shown that when electrons are accelerated to energies of several Bev,
the value of the maximum attainable frequency is strictly limited, and
depends on the limited amplitude of the accelerating voltage.

Card: 1/1

PICROS

AUTHOR: Moroz, Ye. M.

TITLE: Accelerators With Stable Overlapping Particle Trajectories
             (Uskoriteli s ustoychivymi soprikasayushchimisya trayekto-
             riyami chastits)

PERIODICAL: Atomnaya Energiya, 1958, Vol. 4, Nr 3, pp. 238 - 243 (USSR)

ABSTRACT: A new class of accelerators is described, the magnetic systems
             of which consist of several sectors separated by intervals
             of especially weak fields. The magnetic systems habe two
             symmetry planes at right angles to each other. They neither
             have a symmetry axis nor a symmetry center, however. All tra-
             jectories pass through a general point at which the accelera-
             tor element, an "endovibrator", is situated. The stability
             of the moving particles is reached owing to the effect of the
             external magnetic field of the sectors. The provided magnetic
             systems can be used in cyclotrons as well as in microtrons.
             The advantage of this class of accelerators described here
             consists in that with it an increase of the intensity of the
Card 1/2   accelerated ion beam is possible. the supply power can be re-

Accelerators With Stable Overlapping Particle Trajectories

8 - 3-2,'3C

duced, the deflecting of the particles from any trajectory is
easier and the particle energy in the deflected beam is va-
riable within a wide range. There are 6 figures, and '' re-
ferences, 5 of which are Slavic.

SUBMITTED: April 1, 1957

AVAILABLE: Library of Congress

1. Particle accelerators-Design

Card 2/2

21(9)
AUTHOR: Moroz, Ye. M.

TITLE: On "Combined" Accelerators (O "sovmeshchennykh" uskoritel/akn)

PERIODICAL: Atomnaya energiya, 1959, Vol 6, Nr 6, pp 660 - 661 (USSR)

ABSTRACT: The aim of the present "Letter to the Editor" is to show that
a simultaneous combined acceleration of electrons and protons
in one and the same accelerator is possible up to very high
energies (some Bev). In a previous paper the author showed
together with V. I. Veksler that it is possible to accelerate
alternatively or also simultaneously various particles in one
and the same cyclic accelerator. The purely theoretical in-
vestigation carried out by the author refers to two beams moving
towards each other, which consist of oppositely charged parti-
cles of different mass, their interaction and the acceleration
possibilities; if v is the velocity of the system referred to,
in which the sum of the momentum of the two colliding particles
is equal to zero and E_p and E_e the total energy of the proton
and the electron, respectively, moreover if $r_p \approx r_e$ the radii
of curvature of the two particles (in the laboratory system) than

Card 1/2

On "Combined" Accelerators

it holds that

$$v/c = (E_p\beta_p - E_e\beta_e)/(E_p + E_e) = (r_p - r_e)/(r_p/\beta_p + r_e/\beta_e) \leqslant 1;$$ the
laboratory system practically coincides with the system of
the gravitation center. The formulas for the energy change of
the two types of particles due to the collisions are written
down and some of the arising difficulties are discussed, e.g.
that which are connected with the action of the resonance field
accelerating the electrons on the proton beam. The author also
points to the fact that these difficulties may be overcome,
so, for instance, the possibility of a spatial separation of
electron and proton beam in an accelerator with weak focusing is
discussed. The action of the electron resonators on the proton
movement may be weakened if the excitation of the proton
oscillations is made at a frequency considerably exceeding the
rotation frequency of the electrons. There are 3 Soviet references.

SUBMITTED: August 7, 1958

Card 2/2

MOROZ, Ye.M.; RABINOVICH, M.S.

Damping of synchrotron oscillations. Zhur.tekh.fiz. 29
no.2:269-271 F '59.
(MIRA 12:4)

1. Fizicheskiy institut im. P.N.Lebedeva AN SSSR, Moskva.
(Synchrotron)   (Particles, Elementary)

SOV/4098
SOV/5-S-13

PHASE I BOOK EXPLOITATION

Akademiya nauk SSSR. Fizicheskiy institut

Teoriya uskoriteley. Fotoyadernyye reaktsii (Theory of Accelerators. Photonuclear Reactions) Moscow, 1960. 225 p. (Series: Its: Trudy, tom 13) Errata slip inserted. 2,500 copies printed.

Resp. Ed.: D.V. Skobel'tsyn, Academician; Tech. Ed.: Yu. V. Rylina.

PURPOSE: This collection of articles is intended for nuclear physicists interested in the theory of accelerators and photonuclear reactions.

COVERAGE: This collection of three articles, published by the FIAN (Physics Institute, Academy of Sciences USSR) contains the work of A.A. Kolomenskiy, Ye, M. Moroz, and A.N. Gorbunov. Kolomenskiy is concerned with an investigation of the theory of particle movement in modern cyclic accelerators. The article by Moroz deals with a theoretical investigation of methods for increasing the efficiency of cyclic accelerators. The third article, by Gorbunov, discusses photodisintegration of helium. Bibliographies of Soviet and non-Soviet sources appear at the end of each article. The following personalies are mentioned:

Card 1/3

Theory of Accelerators. Photonuclear Reactions   SOV/4098

A.N. Lebedev, L.L. Sabsovich, Academician V.I. Veksler, Director of FIAH;
M.S. Rabinovich, P.A. Cherenkov, A.M. Baldin, Yu. M. Shirokov, Yu. K. Khokhlov,
Aspirant V.V. Daragan, V.M. Spiridonov (deceased), A.G. Gerasimov, Yu. S. Ivanov,
A.V. Kutsenko, V.A. Dubrovina, N.N. Novikova, A.I. Orlova, V.A. Osipova,
V.S. Silayeva, K.V. Chekhovich and S.I. Shornikov.

TABLE OF CONTENTS:

Card 2/3

Theory of Accelerators.   Photonuclear Reactions   SOV/4098

Gorbunov, A.N.   Photodisintegration of Helium   174
   The author analyzes experimental methods, using the Wilson
   chamber in the synchrotron beam; discusses processing the
   results by examination of photographs, identification of
   nuclear disintegrations, measurement of the angle of recoil
   of particles, measurement of particle impulse, etc.; presents
   results of measurements and finally analyzes results.

AVAILABLE: Library of Congress

Card 3/3   JA/vrc/mas
                                                           9-30-60

20673

9.4320 (9/so 1532)

.0327 117

AUTHOR: Ye.M. Moroz

TITLE: A Method for Injecting Charged Particles Into a
            Magnetic Field

PERIODICAL Pribory i tekhnika eksperimenta. 1961. No.1 pp.16-17

TEXT: It is well known that a charged particle can emit
Cherenkov radiation not only when it is moving through a
dielectric but also when it is moving in the neighbourhood of a
dielectric, e.g. in a channel drilled through a dielectric
(Ginsburg, Ref.1), or in a waveguide with metal diaphragms
(A.I. Akhiyezner et al. Ref.2).   Consider a bunch of N charged
particles, moving in a magnetic field H in an orbit of
radius R inside a toroidal waveguide which is partially filled
with a dielectric, or is diaphragmed. The average energy w lost
by each particle per revolution by coherent Cherenkov emission of
wavelength λ is given by

$$w = \frac{8\pi^3 e^2 RN}{\lambda^2 c\gamma} \cdot _i^2 \cdot _\perp^2 \exp - \frac{4}{\lambda\beta} a \qquad (1)$$

Card 1/5

20673

S/12..617.000/001/002/062
L032/114

Method for Injecting Charged Particles Into a Magnetic Field

where e is the electronic charge,   v/c, v is the velocity
of the bunch, c is the velocity of light in a vacuum, 2a is the
width of the chennel in the dielectric filling the waveguide, or
the width of the apertures of the diaphragms in the waveguide, and
$\gamma = (1 - \beta^2)^{-\frac{1}{2}}$. The quantities ζ_l and ζ_r are form factors
which describe the dependence of the energy loss by coherent
Cherenkov emission on the longitudinal and transverse dimensions
of the bunch. For a cylindrical bunch having a circular cross-
section

$$\zeta_l = \frac{\lambda\beta}{\ell} \sin \frac{\pi \ell}{\lambda}; \qquad \zeta_r = \frac{\lambda}{2\pi r} I_1 \left(\frac{2\pi r}{\gamma} \right) \qquad (2)$$

where r is the radius, l is the length and I_1 is the
modified Bessel function. The emitted wavelength depends on
the design of the waveguide and the velocity of the bunch
(V.I. Veksler and G.I. Boroz, vel.60). Only those wavelengths are
emitted for which the angular phase velocity in the retarding
system is equal to the angular velocity of the bunch.
Card 2/5

20673

A Method for Injecting Charged Particles Into a Magnetic Field

It is clearly possible to ensure that the condition $4\pi a < \lambda\beta\gamma$ is satisfied, in which case

$$W \simeq \frac{3}{\lambda^2\gamma\beta} e^2 R \ N \simeq \frac{\pi^3 em_0c^2}{\lambda^2 H} N \cdot 10^{-2} \frac{N}{\lambda^2 (cm) H_{oe}} \quad eV/rev \qquad (3)$$

The latter expression can be used for any cross-sectional shape of the channel, provided the linear dimensions of the aperture are not greater than λ. The injection of charged particles into the magnetic field can proceed as follows, while the energy is being lost by coherent Cherenkov emission, the particle orbit contracts and the bunch of particles misses the injection system. Further reduction in the radius of the orbit in the magnetic field ensures that the bunch leaves the dielectric channel. The amount of coherent Cherenkov radiation will then decrease and the orbit will cease to contact. In order to ensure a high injection efficiency, the change $\triangle R$ in the radius per revolution must satisfy the condition

Card 3/5

20673

S/120/61/000/001/002/062
E032/E114

A Method for Injecting Charged Particles Into a Magnetic Field

$$\frac{d}{k} \leqslant \triangle R = \frac{R}{1 - n} \frac{W}{m_0 c^2 \gamma \beta^2} \tag{4}$$

where d is the transverse dimension of the beam plus the effective thickness of the inner inflector plate, and k is the number of effective revolutions on injection. On the other hand, the bunch must remain small in comparison with the emitted wavelength in spite of the Coulomb repulsions. The transverse stability of the bunch in a magnetic field will be ensured when the following condition is satisfied:

$$I_a = \frac{N}{k} ec\beta < 10\, H_{(oe)}\, R_{(cm)} \gamma \beta^2 \varkappa^2\, (\rho/R)^2 \tag{5}$$

where $\varkappa^2 = 1 - n$ for radial stability and $\varkappa^2 = n$ for vertical stability, n is the magnetic field index and 2ρ is the admissible transverse dimension of the bunch. Assuming that $\ell \simeq 2\rho \simeq d \simeq 1$ cm, $\lambda \simeq 3$ cm, $k \simeq 5$ and $n = 2/3$, one finds from

Card 4/5

20673

S/120/61/000/001/002/062
E032/E114

A Method for Injecting Charged Particles Into a Magnetic Field

Eqs.(3-5) that the optimum number of particles in an injected bunch which still ensures efficient capture and remains stable in the transverse direction is given by

$$ N \quad 5 \cdot 10^{4} \; H^{2}_{(oe)} \tag{6} $$

This approximate formula includes factors representing the inter-action between the injected particles within a given bunch. There are 8 references, of which 4 are Soviet and 4 non-Soviet.

ASSOCIATION·   Fizicheskiy institut AN SSSR
               (Physics Institute. AS USSR)

SUBMITTED: January 21 1960

Card 5/5

20666

24.2120 ($1049,1482,1502,1532$)

26 2321

S/057/61/031/001/011/017
B104/B204

AUTHORS: Moroz, Ye. M. and Shpigel', I. S.

TITLE: Calculation of the electrodynamic pushing out of a non-deform-
             ed plasma ring from a magnetic mirror trap

PERIODICAL: Zhurnal tekhnicheskoy fiziki, v. 31, no. 1, 1961, 78-83

TEXT: One of the methods of accelerating plasmatic formations is the
acceleration of plasma rings in magnetic mirror traps. A. I. Morozov
(Ref. 3) was the first to investigate this process theoretically; in
experimental investigations, a maximum energy transfer to the accelerated
ring presents difficulties. Detailed investigations showed that the
energy transferred to the ring depends on the ratio between the build-up
time of the magnetic field in the mirror trap and the interaction time
of the plasma ring with this field, as well as on the ratio between active
inductivity and the parasitic inductivity etc. For improving this
knowledge, the authors carried out calculations of the motion of a
perfectly conducting ring in the magnetic field of a mirror trap, which
is variable in time. Deformations of the ring radii and proximity effects

Card 1/5

"APPROVED FOR RELEASE: 07/12/2001   CIA-RDP86-00513R001135210012-5

20666

Calculation of the electrodynamic ...   S/057/6·/0:·/:0·/6·:/:·7
                                               3104/B204

were neglected. The two former assumptions increase the results, the
latter assumption diminishes them. Nonetheless, the results obtained
make it possible to estimate the dependence of the energy of the progres-
sive motion of the ring on the parameters of the experimental apparatus.
The authors studied a system of two rings, A and B; A produces the
magnetic mirror trap, and B is accelerated. If A is a metal ring, through
which an electric current flows, an opposed current is generated in the
plasma ring B. The electrodynamic repulsion thus produced moves B in the
direction of the x-axis (Fig. 1). On the basis of an idealized circuit
diagram, the coupling between the two rings is discussed, and the equation
of motion for the plasma ring

$$m\ddot{x} = -\frac{2\pi R}{c}I_2 H_r \quad (1)$$

is set up. Here, I_2 is the current in the plasma ring; H_r is the radial

component of the magnetic field generated by current I_1 in metal ring A at

the place of B; m is the mass of B. (1) is transformed into

$$\ddot{x} = -\frac{I_1^2}{2mc^2 L_2}\frac{dM^2}{dx} \quad (5);$$ I_1 is the current in A; L_2 is the inductivity of

Card 2/5

Calculation of the electrodynamic ...

20666

S/057/61/031/001/011/017
B104/B204

B; M is the interaction factor between the two rings. The time dependence of I_1 is obtained by integration of the differential equation for electric resonant circuits, and thus

$$\ddot{x} = - \frac{U^2 t^2 c^2}{2m} \frac{d}{dx}\left(\frac{1}{L}\right) \qquad (8)$$

is obtained. U is the input voltage; L is the total inductivity of the system; and t is the time. For the purpose of integrating this differential equation, the authors proceed to the following reduced parameter:

$$\zeta = x/2R, \quad \lambda = L_0 L_1, \quad \mu = M/\sqrt{L_1 L_2}, \quad \psi = d\mu/d\zeta, \quad \tau = \sqrt{Uc/2R\sqrt{mL_1}}.$$

Solution is then carried out with $L_1 = L_2$. Fig. 4 shows $(d\zeta/d\tau)_{max}$, ζ_{max}, and τ_{max} as functions of λ with $\zeta = 0.02$ for different conditions. It is noted that these results have been obtained on the assumption of U = const. This makes particular demands on the capacitor battery. For the capacity of this battery, the authors obtain the relation

Card 3/5

20666

Calculation of the electrodynamic ...

S/057/61/031/001/011/017
B104/B204

$$C \gg \frac{m}{U^2} \left(\frac{dx}{dt}\right)^2_{max} \quad (19).$$ Finally, a numerical example is calculated.
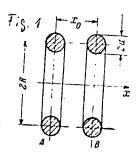
There are 4 figures and 6 references: 5 Soviet-bloc and 1 non-Soviet-bloc.

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva AN SSSR Moskva
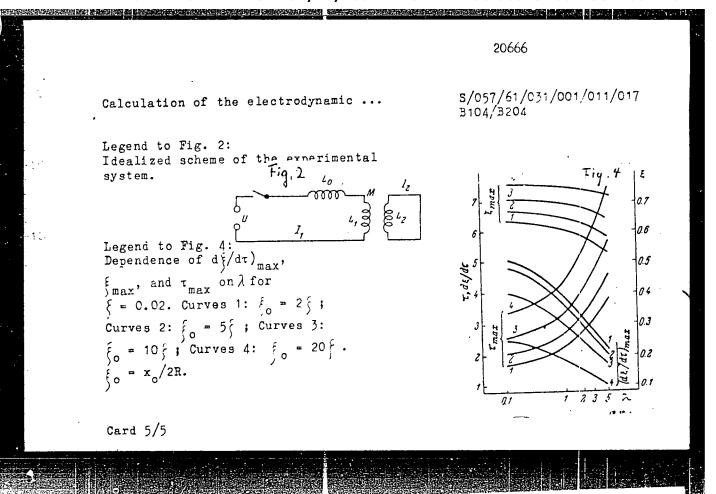(Institute of Physics imeni P. N. Lebedev AS USSR, Moscow)

SUBMITTED: May 24, 1960

Fig. 1

Legend to Fig. 1: Arrangement of the conducting rings.

Card 4/5

20666

Calculation of the electrodynamic ...

Legend to Fig. 2:
Idealized scheme of the experimental
system.

Fig. 2

Legend to Fig. 4:
Dependence of $d\xi/d\tau)_{max}$,

ξ_{max}, and τ_{max} on λ for

$\xi = 0.02$. Curves 1: $\xi_0 = 2\xi$;

Curves 2: $\xi_0 = 5\xi$; Curves 3:

$\xi_0 = 10\xi$; Curves 4: $\xi_0 = 20\xi$.

$\xi_0 = x_0/2R$.

Fig. 4

Card 5/5

MOROZ, Ye.M.

Calculating the accelerating voltage in a variable energy
cyclotron. Zhur.tekh.fiz. 31 no.8:916-922 Ag '61. (MIRA 14:8)

1. Fizicheskiy institut imeni P.N.Lebedeva, Moskva.
(Cyclotron)

MOROZ, YE. M.

95

S/089/62/013/006/019/027
B102/B186

AUTHORS: G. T. and M. R.

TITLE: Nauchnaya konferentsiya Moskovskogo inzhenerno-fizicheskogo
             instituta (Scientific Conference of the Moscow Engineering
             Physics Institute) 1962

PERIODICAL: Atomnaya energiya, v. 13, no. 6, 1962, 603 – 606

TEXT: The annual conference took place in May 1962 with more than 400
delegates participating. A review is given of these lectures that are
assumed to be of interest for the readers of Atomnaya energiya. They are
following: A. I. Leypunskiy, future of fast reactors; A. A. Vasil'yev,
design of accelerators for superhigh energies; I. Ya. Pomeranchuk,
analyticity, unitarity, and asymptotic behavior of strong interactions at
high energies; A. B. Migdal, phenomenological theory for the many-body
problem; Yu. D. Fiveyskiy, deceleration of medium-energy antiprotons in
matter; Yu. M. Kogan, Ya. A. Iosilevskiy, theory of the Mössbauer effect;
M. I. Ryazanov, theory of ionisation losses in nonhomogeneous medium;
Yu. B. Ivanov, A. A. Rukhadse, h-f conductivity of subcritical plasma;

Card 1/4

35

Nauohnaya konferentsiya...   S/089/62/013/006/019/027
                                     B102/B186

design of 30-Mev electron linear accelerator; Ye. G. Pyatnov, A. A. Glazkov,
V. G. Lopato, A. I. Finogenov, G. N. Skepskiy, V. D. Selesnev, experimental
characteristics of low-energy electron linear accelerators; J. A. Zeytlenk,
V. M. Levin, S. I. Piskunov, V. L. Smirnov, V. K. Khokhlov, radiocircuit
parameters of ЛУЭ (LUE)-type accelerators; O. A. Tyagunov, O. A. Val'dner,
B. M. Gokhberg, S. I. Korshunov, V. I. Kotov, Ye. M. Moroz, accelerator
classification and terminology; O. S. Milovanov, V. B. Varaksin, P. R.
Zenkevich, theoretical analysis of magnetron operation; A. G. Tragov,
P. R. Zenkevich, calculation of attenuation in a diaphragmated waveguide;
Yu. P. Lazarenko, A. V. Ryabtsev, optimum attenuation length for linear
accelerator; A. A. Zhigarev, R. Ye. Yeliseyev, review on trajectographs;
I. G. Morozova, G. A. Tyagunov, review on more than 500 ion sources;
M. A. Abroyan, V. L. Komarov, duoplasmatron-type source; V. S. Kuznetsov,
A. I. Solnyshkov, calculation and production of intense ion beams;
V. M. Rybin (Ye. V. Armenskiy), inductive current transmitters of high
sensitivity; V. I. Koroza, G. A. Tyagunov, kinetic description of linear
acceleration of relativistic electrons; A. D. Vlasov, phase oscillations
in linear accelerators; E. L. Burshteyn, G. V. Voskresenskiy, beam field
effects in the waveguide of an electron linear accelerator; R. S. Bobovikov,

Card 3/4

MOROZ, Ye., kand.fiziko-matematicheskikh nauk; IGOREV, M., inzh.

Self-servicing of particles. Znan.-sila 37 no.12:20-21 D '62.

(MIRA 16:2)

(Particle accelerators)   (Cybernetics)

ASKAR'YAN, G.A.; MOROZ, Ye.M.

Pressure generated by the evaporation of matter in a radiation
beam. Zhur.eksp.i teor.fiz. 43 no.6:2319-2320 D '62.

(MIRA 16:1)

1. Institut kristallografii AN SSSR.

(Masers)

S/089/63/014/004/003/019
A066/A126

AUTHORS: Belovintsev, K.A., Belyak, A.Ya., Gromov, A.M., Moroz, Ye.M., Che-
             renkov, P.A.

TITLE: A 6.5 Mev microtron for electron injection into a synchrotron

PERIODICAL: Atomnaya energiya, v. 14, no. 4, 1963, 359 - 363

TEXT: It is first pointed out that the relatively high intensity of the
electron beam attained in conventional microtrons, the simple design of the de-
vice, the escape of a relatively large amount of electrons from the accelerator,
the great similarity of the electron energies, the small divergence angle of the
electrons, and other facts indicate that the microtron may also serve as a syn-
chrotron injector. These assumptions were checked by the authors on the 280 Mev
synchrotron of the Fizicheskiy institut im. P.N. Lebedeva AN SSSR (Institute of
Physics imeni P.N. Lebedev, AS USSR) with the aid of their 6.5 Mev microtron.
The number of electrons retained during acceleration when a magnetron is used as
a synchrotron injector is estimated at about $2.5 \cdot 10^{10}$. It is thus proved that
modern accelerators of this type are very efficient already now, and further de-

Card 1/2

A 6.5 Mev microtron for electron injection ....

S/089/63/014/004/003/019
A066/A126

velopment will make magnetrons even more suitable for this purpose. The magnetic poles and the sheets are made of Cт.3 (St.3) steel. The magnetic poles are 600 mm in diameter, and the diameter of the operating area is 500 mm approximately. The magnet requires 450 w, and the supply of energy is stabilized with an error of about 0.03%. The pressure in the chamber is about $2 \cdot 10^{-6}$ mm Hg. There are 3 figures.

SUBMITTED: June 27, 1962

Card 2/2

S/057/63/033/004/014/021
B165/B234

AUTHOR: Moroz, Ye. M.

TITLE: Dynamics of motion of intersecting beams, taking account of
           their interaction in storing systems

PERIODICAL: Zhurnal tekhnicheskoy fiziki, v. 33, no. 4, 1963, 455 - 461

TEXT: The motion of intersecting electron and positron beams in storing
systems is studied theoretically. For numerical estimates the following
parameter values are used: energy $5 \cdot 10^8$ ev, orbit radius 1.33 m, ratio
of linear to circular parts of the orbit 1 : 3, width of the working
region $2a_{r,max} = 20$ cm, height of the working region $2a_{z,max} = 10$ cm;
magnetic field index in the sectors $n = 0.4 \pm 0.05$; amplitude of ac-
celerating voltage $V_0 = 50$ kv; multiplicity of radiofrequency $q = 2$;
pressure in the vacuum chamber of the storing system $p = 5 \cdot 10^{-10}$ torr;
interval between successive injections $\Delta t = 5$ sec. For this system the
following results are found: Energy loss per revolution due to synchro-
tron radiation 4.15 kev; damping time of vertical betatron oscillations
Card 1/3

S/057/63/033/004/014/021
B163/B234

Dynamics of motion of...

9 m sec; damping time of radial betatron oscillations 13.5 m sec; damping time of synchrotron oscillations 3.85 m sec, beam width of stored particles, determined by quantum fluctuations $d = \sqrt{d_r^2 + d_s^2}$ = 3.25 mm, d_r = 2.9 mm; d_s = 1.45 mm; length of the bunch of stored particles 0.25 m; frequency of synchrotron oscillations 10^6 rad/sec; vertical dimension of the bunch of stored particles as determined by scattering of the particles from the atoms of the residual gas 5.3 μm; Life-time of the beam of stored particles, determined by single acts of bremsstrahlung emission τ = 88 h. If the number of particles in a bunch is $N = 10^{10}$, the action of the intersecting beam is equivalent to the action of a thin lens with a focal length of 4.6 m; such encounters happens $2q = 4$ times per revolution. The corresponding beam deflections are calculated and conditions for the occurrence of frontal encounters are derived. If $N > 5 \cdot 10^8$ the probability of skew passage of the beams without collision becomes important. In order to increase the number of frontal encounters, it is suggested to increase the vertical dimensions of the bunch by introducing a resonance mechanism between the vertical

Card 2/3

Dynamics of motion of...

and radial oscillations. Since the vertical oscillation frequency ω_z increases more rapidly with increasing N than the radial oscillation frequency ω_r, there is one value of N, depending on the field index n, for which both coincide. The maximum number of particles for which this resonance mechanism works is $1.6 \cdot 10^{10}$.

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva (Physics Institute imeni P. N. Lebedev)
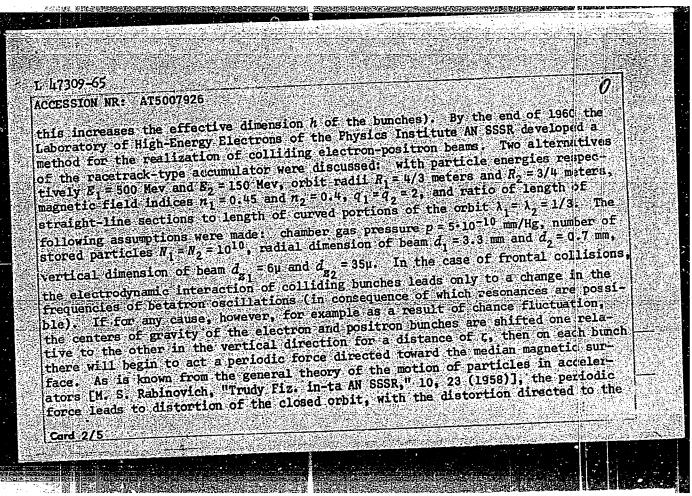
SUBMITTED: March 19, 1962

Card 3/3

VEKSLER, V.I.; PISAREV, V.Ye.; MOROZ, Ye.M.; RATNER, B.S.

The 30 Mev. synchrotron of the Physical Institute.   Trudy Fiz.
Inst. 19:98-150 '63.   (MIRA 16:8)

(Synchrotron)

L 47309-65   EWT(m)/EPA(w)-2/EWA(m)-2   Pab-10/Pt-7   IJP(c)   GS

ACCESSION NR: AT5007926   S/0000/64/000/000/0368/0371

AUTHOR: Moroz, Ye. M.

TITLE: Stability of the collisions of colliding beams in storage (Report not considered)

SOURCE: International Conference on High Energy Accelerators. Dubna, 1963. Trudy. Moscow, Atomizdat, 1964, 368-371

TOPIC TAGS: high energy accelerator, charged particle beams

ABSTRACT: In the present report, three methods are discussed for the elimination of orbit instability: a method of utilization of the coupling resonance of beta-tron oscillations (which does not require any auxiliary apparatus and is based on the use of latent possibilities of electromagnetic storage systems: only needed is the correct selection of the storage parameters n, λ, and q); a method of intersec-tion of beams at small angles (ensured by having the bunches of electrons and posi-trons move on different orbits); and a method of noise shaking of the oscillations (requiring the arrangement of condensers in the vacuum chamber of the accumulator, which have a noise potential imposed on them with a comparatively narrow band, thus causing shaking of the betatron oscillations of the particles in random phases;

Card 1/5

L 47309-65   0

ACCESSION NR: AT5007926

this increases the effective dimension h of the bunches). By the end of 1960 the Laboratory of High-Energy Electrons of the Physics Institute AN SSSR developed a method for the realization of colliding electron-positron beams. Two alternatives of the racetrack-type accumulator were discussed: with particle energies respectively $E_1 = 500$ Mev and $E_2 = 150$ Mev, orbit radii $R_1 = 4/3$ meters and $R_2 = 3/4$ meters, magnetic-field indices $n_1 = 0.45$ and $n_2 = 0.4$, $q_1 = q_2 = 2$, and ratio of length of straight-line sections to length of curved portions of the orbit $\lambda_1 = \lambda_2 = 1/3$. The following assumptions were made: chamber gas pressure $p = 5 \cdot 10^{-10}$ mm/Hg, number of stored particles $N_1 = N_2 = 10^{10}$, radial dimension of beam $d_1 = 3.3$ mm and $d_2 = 0.7$ mm, vertical dimension of beam $d_{z1} = 6\mu$ and $d_{z2} = 35\mu$. In the case of frontal collisions, the electrodynamic interaction of colliding bunches leads only to a change in the frequencies of betatron oscillations (in consequence of which resonances are possible). If for any cause, however, for example as a result of chance fluctuation, the centers of gravity of the electron and positron bunches are shifted one relative to the other in the vertical direction for a distance of ζ, then on each bunch there will begin to act a periodic force directed toward the median magnetic surface. As is known from the general theory of the motion of particles in accelerators [M. S. Rabinovich, "Trudy Fiz. In-ta AN SSSR," 10, 23 (1958)], the periodic force leads to distortion of the closed orbit, with the distortion directed to the

Card 2/5

L 7307-65

ACCESSION NR: AT5007926

side opposite to the action of the force. Consequently the closed orbits of the electron and positron beams become shifted, at points of collision of the bunches, towards opposite sides from the median magnetic surface. The particles execute around their closed orbits damping betatron oscillations. As a result of such a process the distance ζ between the centers of the bunches during collision will vary as long as the position of equilibrium is not attained. Coulomb forces and current attraction of the bunches one for another initially grows linearly for increasing distance ζ between the centers of the bunches; afterwards they cease to vary and finally fall off at large distances. Therefore the problem of the interaction of bunches is theoretically nonlinear. The motion of a bunch cannot be considered as given, and a self-consistent solution must be found. Nevertheless the problem is easily solved. The curve for ζ as a function of the vertical component of the force that acts on a particle of the bunch is divided into linear growth, constant value, and hyperbolic drop. The conditions for stability of collisions can be obtained by considering only the linear portion. The equilibrium declination of the bunches in a 500-Mev storage system can be found by considering only the horizontal portion of the curve, and finally the equilibrium distance between the bunches in a 150-Mev accumulator for $N = 10^{10}$ is found from the hyperbolic portion of this curve. The condition for stability depends upon the rf multiple q, since for increasing q the number of particles in each bunch decreases q times and their

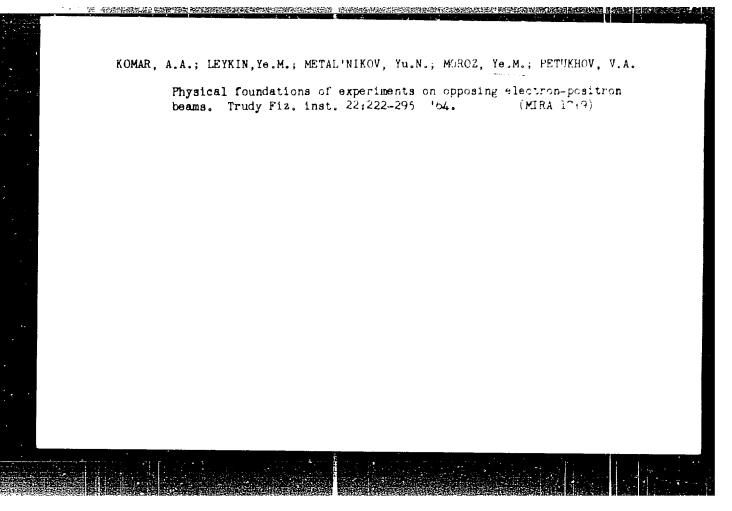Card 3/5

L 47309-65

ACCESSION NR: AT5007926   0

interaction during collisions weakens, but the number of collisions per revolution, equal to $2q$, grows. Various types of distortions of the orbit are possible. Already investigated is the type of distortion for which the positron bunch alternately passes now below and now above the electron bunch [Ye. M. Moroz, "Zhurnal tekh. fiz.," 33, 455 (1963).] The safest type of distortion, however, turns out to be one for which the positron bunch passes two times in succession above the electron bunches, and afterwards two times in succession beneath the electron bunches. The condition for stability relative to this type of orbit distortions possesses the following form

$$\frac{N_+ + N_-}{2} F < 1;$$

$$[F = \frac{8\pi r_0 R}{q\gamma hD} \sqrt{\frac{1+\lambda}{\pi}} \, tg \frac{\pi \sqrt{\pi(1+\lambda)}}{2} \times$$

$$\times (F_1 = 10^{-5}; \, F_2 = 1.5 \cdot 10^{-5}).$$

Here N_- is the number of stored electrons, N_+ is the number of stored positrons, r_0 is the classical radius of the electron, gamma γ is the ratio of energy of particle to its rest energy, h and D are vertical and radial dimensions of the bunch respectively which are calculated from consideration of interaction of colliding beams. If this condition is fulfilled, then the declinations of the bunches from the mean plane grow as long as the center of one bunch does not escape beyond

Card 4/5

L 47309-65

ACCESSION NR: AT5007926

the limits of the other bunch. In this case half of the electrons cease to collide with the colliding positrons. With further declination of the particles, a smaller and smaller number of electrons participate in the collisions. Collisions of particles of colliding bunches cease unless $(N_+ + N_-)F < 4$. Orig. art. has 12 formulas.

ASSOCIATION: Fizicheskiy institut imeni P. N. Lebedev AN SSSR (Physics Institute Academy of Sciences SSSR)

SUBMITTED: 26May64   ENCL: 00   SUB CODE: NP

NO REF SOV: 002   OTHER: 000

Card 5/5

KOMAR, A.A.; LEYKIN,Ye.M.; METAL'NIKOV, Yu.N.; MOROZ, Ye.M.; PETUKHOV, V.A.

    Physical foundations of experiments on opposing electron-positron
    beams. Trudy Fiz. Inst. 22:222-295 '64.   (MIRA 17:9)

GLADYSHEV, V.A.; KATSAUROV, I.N.; KUZNETSOV, A.N.; MOROZ, Ye.M., N HAYEVA, L.F.

Design of a spiral-coil 300 Kev. cyclotron with external injection.
Atom. energ. 19 no.5:442 N '65.

Magnetic field of a spiral-coil 300 Kev. cyclotron with external
injection. Atom. energ. 19 no.5:443 N '65.

L 3777-66   EWT(m)/EPA(w)-2/EWA(m)-2   IJP(c)   GS

ACCESSION NR: AT5007946   S/0000/64/000/000/0658/0661

AUTHOR: Gladyshev, V. A.: Katsaurov, L. N.; Kuznetsov, A. N.; Martynova, L. P.; Moroz, Ye. M.

TITLE: Concerning the input of ion beam into a cyclotron /9

SOURCE: International Conference on High Energy Accelerators. Dubna, 1963. Trudy. Moscow, Atomizdat, 1964, 658-661

TOPIC TAGS: cyclotron, particle beam

ABSTRACT: The problem of the external injection of ions into a cyclotron remains especially pressing in connection with the problem of the acceleration of polarized ions, because the source of polarized particles, like some other complex sources, cannot be situated at the center of the cyclotron. Since, in the case of external injection, the acceleration begins with a certain initial energy, it is possible to avoid a number of difficulties connected with the first revolutions in the central portion of the cyclotron. One of the procedures for solving this problem is to input the beam along the vertical axis of the cyclotron and turn it by an electrostatic deflecting system through 90° into the median plane. The most substantial deficiencies, it seems, of axial input of the beam is the considerable losses and

Card 1/4

L 3777-66
ACCESSION NR: AT5007946

the complexity of the deflecting system. The present report indicates how it is possible to realize external beam injection in the median plane of the magnet. This can be done especially simply in sector cyclotrons. In a nonhomogeneous magnetic field, charged particles experience a drift across the gradient of the magnetic field. It is expedient to take advantage of this in the sector cyclotron by directing the beam of particles so that they drift up to the central region of the cyclotron along the boundary of one of the sectors. In the central region it is possible with the help of a cylindrical electrostatic field to transfer the particles to the trajectory required later. In the case of a homogeneous magnetic field, which almost always holds true at the central region of sector cyclotrons, the minimum electrical field strength $\mathcal{E}_{min}$ in the cylindrical condenser that is necessary for the transfer of the particles from one trajectory to another can be represented by the formula

where W is the kinetic energy of the particles in kev; R is the radius of curvature (for a nonrelativistic single-charged ion; $R = 4.57 \cdot 10^3 \frac{\sqrt{W}}{B}$);

Card 2/4

L 3777-66
ACCESSION NR: AT5007946

M is the mass of the ion in units of the mass of the nucleon; ϕ is the angle between the trajectories at the point of their intersection. As it turns out, it is possible to choose the place for injecting the particle beam such that it will always be focused on its path along the magnet sector. On the path to the central region of the cyclotron it is possible to describe a series of loops, and also the frequency of a particle's revolution (more precisely, the frequency of loop formation). The quality of the magnetic focusing of the particles is characterized by the ratio of the frequencies of the particles' horizontal and vertical oscillations to the mentioned frequency of loop formation. The radial focusing of the ions in the magnetic system considered almost does not differ from focusing in a homogeneous magnetic field. Similar considerations hold for the vertical focusing of the ions. The conditions for the stability of the vertical motion of the ions are characterized by inequalities involving the magnetic field in the gap between the sectors in the region of beam passage. In the case of the authors' cyclotron, there always exists a wide interval of initial distances of the beam from the sector boundary for which the injected ions can reach the central region of the cyclotron magnetic without experiencing defocusing. The experimental verification of the possibility of external injection by the considered method was carried out on a three-sector cyclo-

Card 3/4

L 3777-66
ACCESSION NR: AT5007946

tron with straight sector borders (magnet diameter--720 mm; accelerated particles--
350 Kev deuterons). The experimental set-up and results are described in the pre-
sent report. Orig. art. has: 4 figures.

ASSOCIATION: Fizicheskiy Institut imeni P. N. Lebedeva AN SSSR (Physics Institute,
AN SSSR)

SUBMITTED: 26May64   ENCL: 00   SUB CODE: NP

NO REF SOV: 000   OTHER: 001

Card 4/4

L 45586-65   EWT(m)/EPA(w)-2/EWA(m)-2   Pab-10/Pt-7   IJP(c)   DM

ACCESSION NR: AP5009109

8/0089/65/018/003/0213/0218

AUTHOR: Gladyshev, V. A.; Katsaurov, L. N.; Kuznetsov, A. N.; Martynova, L. I.;
Moroz, Ye. M.

TITLE: Injection of an ion beam in a cyclotron

SOURCE: Atomnaya energiya, v. 18, no. 3, 1965, 213-218

TOPIC TAGS: cyclotron, accelerated particle injection, polarized ion acceleration,
sector cyclotron

ABSTRACT: It is shown that external injection of a beam in the median plane of a
magnet is possible, and is particularly easy to effect in sector cyclotrons. This
is of importance for the acceleration of polarized ions, since sources of such ions
cannot be placed normally in the center of a cyclotron. In the method proposed
the beam can be delivered to the accelerating gap practically without losses, which
is of great importance for polarized particles. This is done by directing the
particles in such a way that they drift to the central region of the cyclotron a-
long the boundary of one of its sectors. The equations of motion are analyzed with
an aim at selecting the right initial injection conditions to prevent defocusing

Card 1/4

L 45586-65

ACCESSION NR: AP5009109

of the beam, to produce the correct drift of the particles in the central region, and to bring the injected particles to the theoretical trajectory from which acceleration begins. The theoretical results were tested with the sector cyclotron shown in Fig. 1 of the Enclosure (magnet diameter 720 mm), designed to accelerate deuterons to 150 keV energy. The injected particles were H2 ions from a Penning source, pre-accelerated to 30 keV. The beam could be brought to the dee gap without losses. The initial current was 1.5 μA and the accelerating voltage was 15 kV at 3 Mcs. The acceleration efficiency was 20%, i.e., the current dropped to 0.3 μA after the first two revolutions after which it remained constant at this value. A picture of the beam trajectory is shown in Fig. 2 of the Enclosure. "The authors thank A. A. Kolomenskiy for useful discussions. Orig. art. has: 5 figures and 22 formulas.

ASSOCIATION: None

SUBMITTED: 1Mar64

ENCL: 02   SUB CODE: NP

NR REF SOV: 000

OTHER: 002

Card 2/4

L 27967-66   EWT(m)   IJP(c)

ACC NR: AF6017683

SOURCE CODE: UR/0089/65/019/005/0442/0442

AUTHOR: Gladyshev, V. A.; Katsaurov, L. N.; Kuznetsov, A. N.; Moroz, Ye. M.; Nechayeva, L. P.

ORG: none

TITLE: Construction of a 300 kev sector cyclotron with external injection (Entire article)

SOURCE: Atomnaya energiya, v. 19, no. 5, 1965, 442

TOPIC TAGS: cyclotron, particle accelerator target, deuteron, diffusion pump, cyclotron magnet, vacuum chamber/N-5T diffusion pump

ABSTRACT: With thin targets, accelerated particles can be used more effectively if additional acceleration is applied to them after they have passed through the target (. L. N. Katsaurov and V. G. Latysh, Trudy FIAN SSSR /Proceedings of the Physics Institute, Academy of Sciences USSR/, Vol 33, p 235 (1965)). A small ~300 kev deuteron sector cyclotron was constructed at the Physics Institute to test the feasibility of applying additional acceleration. Plans have been made to carry out a number of investigations with this cyclotron especially since it is equipped to inject ions into the median plane (V. A. Gladyshev, et al., Trudy Mezhdunarodnoy Konferentsii po Uskoritelyam /Proceedings of the International Conference on Accelerators, Dubna, 1963/, Moscow, Atmoizdat, 1964, p. 658. The cyclotron magnet assembly consists of three individual C-shaped

Card 1/3

UDC: 621.384.611

L 27967-66

ACC NR: AP6017683

magnets. This design provides for a very deep azimuthal variation of the magnetic field without requiring additional windings between the sectors and permits easy access to the chamber. The diameter of the magnet is 70 cm. The pole pieces are sectors with straight edges and 66 deg. angles. The supply current to the magnets is stabilized to 3×10^{-6}. Furthermore, the field of each magnet is stabilized by an independent proton stabilization circuit.

The pole pieces of the magnet serve partly as the covering of the vacuum chamber, and the chamber itself consists of several parts. Its main part has three triangular chambers made of brass, each bolted to the sides of the secotr pole pieces of two adjacent magnets. Vacuum sealing is provided by lead wire which is laid on the joints between the various parts and is squeezed tight by special fittings. An N-5T type oil diffusion pump provides a vacuum of $\sim 2 \times 10^{-6}$ mm Hg during operation with a beam.

Movable probes are available for observation of the beam. These probes can be positioned in any point of the vacuum chamber at the desired angle to the beam by virtue of a teflon sealed ball joint and a movable cross-bar that has Wilson-type teflon seals.

The source, together with the accelerator tube, can be moved in the median plane of the magnet; making it possible to vary the beam injection point within the chamber.

Card 2/3